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DEVICE FOR MOUNTING OR FOR EXCHANGING THE PRINTING CYLINDER CASINGS OF A PRINTING CYLINDER

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The invention pertains to a device for mounting or for exchanging the printing cylinder casings (sleeves) of a printing cylinder (plate cylinder) of a roller-type rotary printing machine,

preferably a flexographic printing machine, comprising a mounting frame in which one end of the printing cylinder can be clamped.

In order to exchange the printing plates of a printing cylinder, it is known that the printing cylinders can be provided with exchangeable printing cylinder casings that are sheath-shaped or that have the shape of a tubular section and whose outer sides form the plate. In order to facilitate the procedure for pushing the printing cylinder casings onto the printing cylinder from one side, it is known that the printing cylinder can be constructed in a slightly conical fashion and that the printing cylinder casing can be constructed in a correspondingly complementary manner, whereby, in order to expand the printing cylinder casing, holes for compressed air open out in the casing surface of the printing cylinder and can be impinged by compressed air during installation of the printing cylinder casing.

In order to be able to pull off a printing cylinder casing (also termed a sleeve) from the printing cylinder or to be able to push it onto the printing cylinder, it is known that a shaft journal of the printing cylinder can be supported on a supporting trestle and that a tube can be pushed onto the other shaft journal for the purpose of lengthening it, so to speak, whereby this tube is likewise supported at its outer end on a supporting trestle and, in order to pull off the printing cylinder casing, this casing is pulled onto the tube and then it can be removed from it after supporting the printing cylinder temporarily on a trestle that has been inserted at the shaft journal that is carrying the tube. In order to push on a printing cylinder casing, one then proceeds in the correspondingly reversed manner. This known method of exchanging the printing cylinder casing via a supporting tube that lengthens a shaft journal is laborious. It is for this reason that attempts have already been made in practice to clamp a printing cylinder at one of its ends, namely via its shaft journal, in a mounting frame of the type indicated at the beginning in such a way that the printing cylinder is held therein in a freely and outwardly projecting manner so that the procedure for pulling off and pushing on printing cylinder casings is possible without special supporting devices. However, it has been shown, especially in the case of relatively large plate cylinders, that permanent bowing occurs at the clamped journal of the plate cylinder as a consequence of the great weight.

The problem for the invention is therefore to create a device of the type that was indicated at the beginning with which printing cylinders can be clamped in a mounting frame with one end freely and outwardly projecting with no fear of warped regions or damaged regions of the printing cylinder or shaft journal.

In accordance with the invention, this problem is solved in the case of a device of this general type by way of the feature that coupling elements are connected or can be connected to a front side of the printing cylinder at a certain radial separation from its shaft journal, the coupling elements being capable of coupling with counter-coupling elements of the mounting frame, so

that the printing cylinder can be held in a freely floating manner in the mounting frame. The coupling elements that are connected or that can be connected to a front side of the printing cylinder, in accordance with the invention, grip it at a relatively large vertical separation from the center line so that the reaction force couple does not exceed a permissible magnitude. The forces are hereby passed on directly to the printing cylinder, which is capable of handling these stresses with no fear of damaged regions or deformed regions.

The coupling element expediently comprises a ring that borders the shaft journal. This ring can be provided with suitable recesses and/or cut-out areas to permit coupling to the counter-coupling elements of the mounting frame.

In accordance with an advantageous form of embodiment, the ring is provided with an annular groove with which retaining jaws of the counter-coupling elements engage, wherein the retaining jaws are provided with circular arc-shaped cut-out areas.

In order to prevent the situation in which supporting forces are transferred from the ring to the shaft journal, the ring can border the shaft journal with the accompanying formation of an annular gap.

The ring is expediently capable of being bolted to the front surface of the printing cylinder via a flange-shaped component.

In accordance with a preferred form of embodiment, the feature is provided that, on one side, the mounting frame has a supporting trestle with a retaining jaw that is open in the upward direction and that has been recessed in an approximately semicircular manner, wherein the edge region of it is complementary to the annular groove. For the purpose of coupling in a positive interlocking manner, an upper retaining component can be connected to the trestle, wherein the upper retaining component possesses a jaw component that engages with the annular groove and is recessed in a complementary circular arc shape.

The upper retaining component is expediently mounted on the supporting trestle in a manner that permits swiveling about an axis that is parallel to the shaft journal, and can be bolted to the supporting trestle at its side opposite the junction.

In another form of embodiment of the invention, the feature is provided that two supporting rollers, upon which a peripheral edge of the retaining ring is supported, are mounted at the lower retaining jaw at a certain radial separation from the circular arc-shaped edge. In this way, support on the peripheral surface of one of the two ring-shaped sections of the retaining ring can take place, wherein these sections border the groove.

The inner flank of the annular groove is expediently broader than the outer one. The inner, target-shaped section, which delineates the groove and whose diameter is larger than the outer target-shaped section, can also simultaneously form the attachment flange.

On the base plate that supports the supporting trestle, namely on the side opposite it, a piston/cylinder unit for a compressed medium can be provided with a support, which can be raised and lowered, for the other shaft journal.

An embodiment example of the invention will be elucidated below by means of the drawings. The following are shown therein:

Figure 1, a lateral view of the plate cylinder installation device with a partially cut away supporting trestle with coupling elements;

Figure 2, a view of the coupling housing of the supporting trestle in the direction of the arrow A illustrated in sectional form in Figure 1; and

Figure 3, a plan view of the coupling housing in accordance with Figure 2, wherein the upper component thereof, which is capable of swiveling, has been omitted for the sake of achieving a better overview.

The rack 1, which can be seen from Figure 1, has a piston/cylinder unit 3 on its left side, whose cylinder 2 is firmly attached to the base frame or the base plate of the mounting frame 1. The piston 4 of this piston/cylinder unit has a corbel 5 at the end opposite the cylinder 2, upon which the journal 6 of the plate cylinder 7 rests via a bearing 8. A strengthening ring 9 is firmly connected to the front wall 10 of the plate cylinder 7, namely at the end of the plate cylinder 7 opposite the journal 6. The strengthening ring 9 has a peripheral groove 11 with which the front walls 12 and 13 of the housing 14 engage, as a result of which the plate cylinder 7 is held. The housing 14 is firmly connected to the rack 1. It comprises a lower base plate 15 along with two side walls 16 and 17. A front wall 12 is firmly connected to the two side walls 16 and 17 and also to the base plate 15, wherein the front wall is offset and has a circular arc-shaped recess 18. Two supporting rollers 19 and 20 are connected in a rotatable manner to the front wall 12 in the region of this recess 18. A lid 22 is connected via a hinge 21 to this lower component that has been constructed in this way, and comprises the front wall 13, an upper cover plate 23 connected to the front wall, and two side walls 24. Stanchions 25 are welded to the lid 22 and to the front wall 13 for the purpose of strengthening the lid 22. Just as in the case of the front wall 12 of the lower component, the front wall 13 has a circular arc-shaped recess 26 that has a collar-shaped hollowed-out region 27.

The plate cylinder 7 that is illustrated in Figure 1 is consequently inserted from above into the housing 14 that has been swung open, wherein the recess 18 is positioned in the peripheral groove 11 of the strengthening ring 9. The outer projecting edge 28 of the strengthening ring 9 is hereby supported on the supporting rollers 19 and 20. As soon as this has happened, the lid 22 is swiveled out of the position illustrated via the full lines in Figure 2 and into the position illustrated via the dashed and dotted lines in Figure 2 in such a way that the recess 26 is positioned from above in the peripheral groove 11, wherein the collar-shaped hollowed-out

region 27 lies adjacent to the outwardly projecting edge 28 of the strengthening ring 9. As soon as this has happened and the lid 22 has been bolted to the lower component in a way that has not been illustrated in further detail, the plate cylinder is first rotated into the desired position, after which the piston rod 4 is driven downward. The plate cylinder 7 is thus mounted in a one-ended manner, as a result of which the installation of a sleeve from the free side is readily possible. The forces that are required for supporting the plate cylinder 7 are not passed onto the journal 29, but rather to the front wall 10 of the plate cylinder 7 via the strengthening ring 9. It is for this reason that deformations of the journal 29 are not to be feared. In order to fully ensure this, the strengthening ring 9 has a continuous bored-out hole 30 that is slightly larger than the external diameter of the journal 29.

Claims

1. Device for mounting or for exchanging the printing cylinder casings (sleeves) of a printing cylinder (plate cylinder) of a roller type rotary printing machine, preferably a flexographic printing machine, comprising a mounting frame (1) in which one end of the printing cylinder (7) can be clamped,

characterized by the feature

that coupling elements (9) are connected or can be connected to the front side of the printing cylinder (7) at a certain radial separation from its shaft journal (29), wherein the coupling elements can couple with counter-coupling elements (18, 26) of the mounting frame (1), so that the printing cylinder (7) can be held in a freely floating manner in the mounting frame (1).

2. Device in accordance with Claim 1, characterized by the feature that the coupling element comprises a ring (9) that borders the shaft journal (29).

3. Device in accordance with Claim 2, characterized by the feature that the ring (9) is provided with an annular groove (11) with which retaining jaws of the counter-coupling elements engage via circular arc-shaped cut-out areas (18, 26).

4. Device in accordance with Claim 2 or 3, characterized by the feature that the ring (9) borders the shaft journal (29) with the accompanying formation of a ring-shaped gap.

5. Device in accordance with one of Claims 2–4, characterized by the feature that the ring (9) can be bolted to the front surface of the printing cylinder (7) via a flange-shaped component.

6. Device in accordance with one of Claims 1–5, characterized by the feature that, on one side, the mounting frame (1) has a supporting trestle (14) with a retaining jaw (18) that is open in the upward direction and that has been recessed in an approximately semicircular manner, wherein the edge region of the retaining jaw is complementary to the annular groove (11).

7. Device in accordance with one of Claims 1–6, characterized by the feature that an upper retaining component (22) can be connected to the trestle, and possesses a jaw component

(26) that engages with the annular groove (11) and is recessed in a circular arc shape complementary to the annular groove.

8. Device in accordance with one of Claims 1–7, characterized by the feature that the upper retaining component (22) is mounted on the supporting trestle (14) by means of a hinge (21) in a manner that permits swiveling about an axis that is parallel to the shaft journal (29) and at its side opposite the junction (21) and can be bolted to the supporting trestle.

9. Device in accordance with one of Claims 1–8, characterized by the feature that two supporting rollers (19, 20) are mounted at the lower retaining jaw at a certain radial separation from the circular arc-shaped edge (18), wherein a peripheral edge of the retaining ring (9) is supported on them.

10. Device in accordance with one of the preceding claims, characterized by the feature that the inner flank of the annular groove (11) is broader than the outer one.

11. Device in accordance with one of Claims 1–10, characterized by the feature that, on the base plate or base frame that supports the supporting trestle (14), namely on the side opposite the supporting trestle, a piston/cylinder unit (3) for a compressed medium is provided with a support (5), which can be raised and lowered, for the other shaft journal.

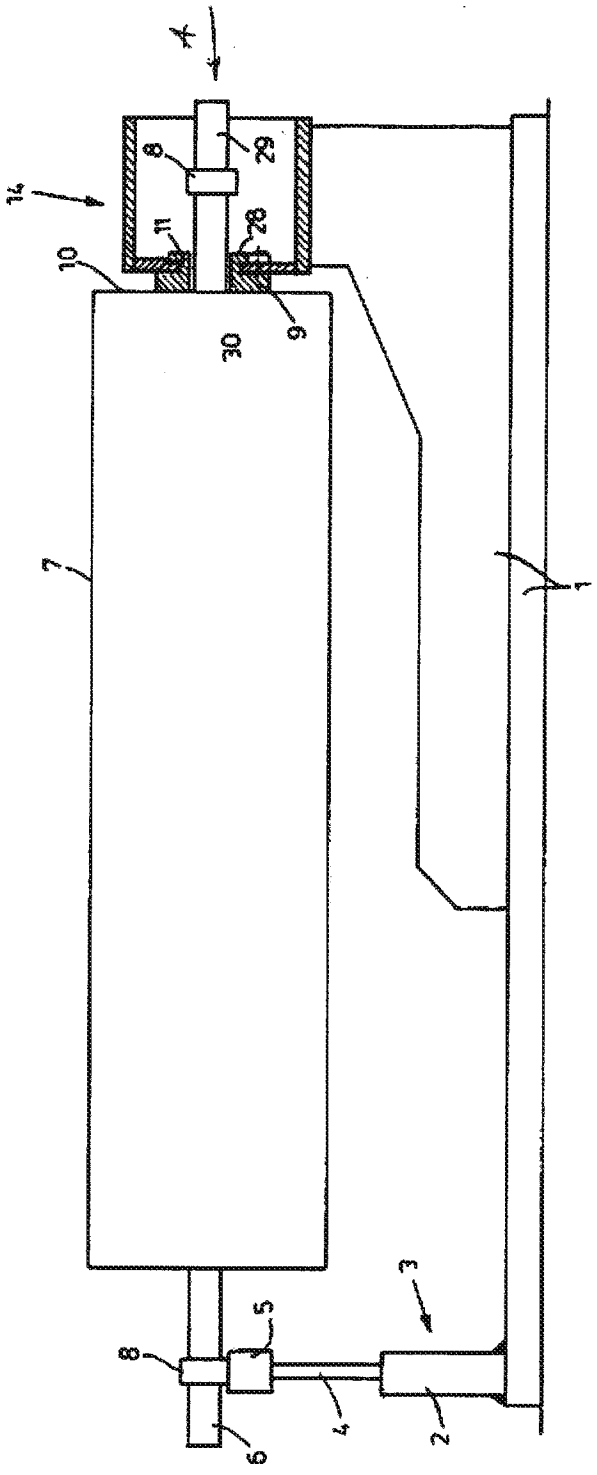

Figure 1

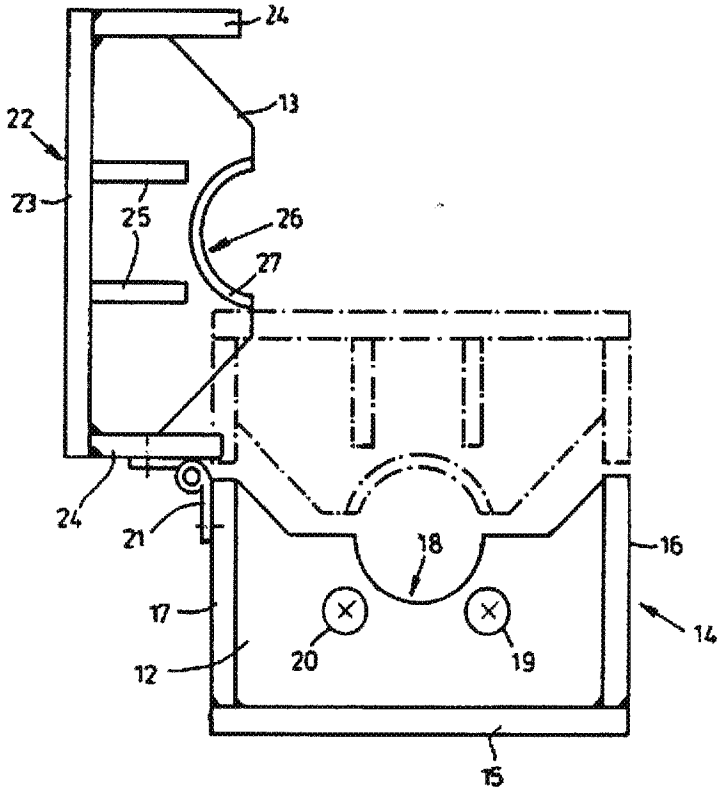

Figure 2

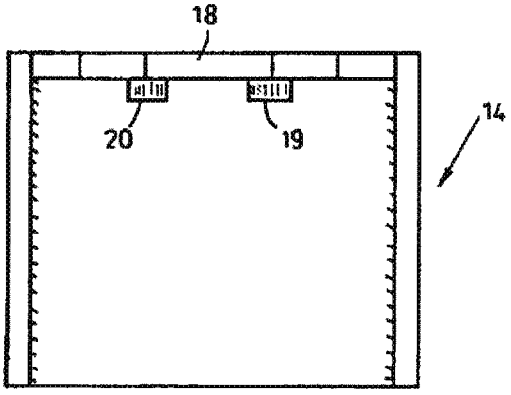

Figure 3